POOR LEGIBILITY

ONE OR MORE PAGES IN THIS DOCUMENT ARE DIFFICULT TO READ DUE TO THE QUALITY OF THE ORIGINAL

ITT Aerospace Controls Division
ITT Fluid Technology Corporation

December 28, 1993

Mr. Gregg Kwey
Senior Water Resource Control Engineer
California Regional Water Quality Control Board
Los Angeles Region
101 Centre Plaza Drive
Monterey Park, California 91754-2156

WELL INVESTIGATIONS PROGRAM - SUPPLEMENTARY SUBSURFACE INVESTIGATION (FILE NO. 104.0582)

Dear Mr. Kwey:

Enclosed please find three copies of our "Cone Penetrometer and HydroPunch Testing Work Plan", prepared by ENVIRON Corporation and dated December 21, 1993. As is customary, the purpose of this letter is to submit the above referenced work plan for LARWQCB approval prior to implementation. Also, in order to avoid any potential confusion regarding lead agency approval for completion of this work, we are also submitting a copy of this plan to the Los Angeles Fire Department Hazardous Materials Control Program.

The scope of work presented in this plan is designed to allow for a limited evaluation of soils and groundwater underlying a specific area of the site. This work plan has also been prepared to provide additional information to augment the current well installation program.

ITT is interested in implementing this work plan as soon as possible, and we would appreciate your prompt review and response so that we may schedule completion of the work. As always, should you have any questions or comments, please contact me at (818) 953-2119.

Yours Truly,
ITT
Teresa C. Olmsted
Teresa P. Olmsted
Manager, Environmental Projects

cc: A. Veloz - LARWQCB
P. Kani - LAFD
ITT Distribution
LARWQCB file
LAFD file

enclosure

RWQ1228

1200 South Flower Street, Burbank, CA 91502
Telephone (818) 842-6131 FAX (818) 842-8239

CONE PENETROMETER AND HYDROPUNCH TESTING WORK PLAN

ITT Fluid Products Corporation
Aerospace Controls Division
Burbank/Glendale, California

Prepared by

ENVIRON Corporation
Irvine, California

December 21, 1993

CONTENTS

CONTENTS
(continued)

FIGURES

APPENDICES

1.0 INTRODUCTION

This work plan presents the technical approach and scope of work for the Cone Penetrometer (CPT) and HydroPunch investigation to be conducted at the ITT facility on Flower Street in Burbank and Glendale, California (Figure 1). This work plan has been prepared to help identify the extent and location of diesel fuel previously detected in ground water underlying the site.

1.1 Objectives

The CPT/HydroPunch investigation has been designed to achieve the following:

- Assess the relationship between diesel fuel contamination known to originate at the Interstate Brands Corporation (IBC) site, located immediately north and northeast of the ITT facility, and diesel fuel contamination detected in ground water underlying the ITT facility,

- Evaluate the extent to which diesel fuel ground water contamination originating on the IBC property has migrated underneath the ITT facility,

- Assess the nature and extent of diesel fuel and volatile organic compounds (VOCs) in the perched and upper water-bearing zones underlying the northeastern portion of the ITT facility, and

- Assist in the evaluation of soils underlying the site, and use this information to help develop a conceptual geologic model for the Facility.

1.2 Approach

The CPT/HydroPunch investigation proposed herein will be conducted to supplement existing information regarding the ITT facility. This work plan presents a scope of work that is considered appropriate given current knowledge of ITT facility conditions. In order to maximize the usefulness of data collected during the program, the investigation will utilize a phased approach. First the CPT work will be conducted, and data will be reviewed to provide additional information regarding subsurface lithology, permeability, and the location of the perched and upper water-bearing zones. Then HydroPunch locations and sampling depths will be selected and ground water and/or diesel free product samples will be collected to provide information regarding the distribution of VOCs and diesel fuel in ground water underlying the ITT facility.

The planned scope of work consists of:

- Conducting approximately 20 CPT tests (each 80 to 100 feet deep) at the ITT facility in the area north of existing wells SW-1 and SW-2, and south of Well PW-2,
- Collecting ground-water samples and/or diesel free product samples at approximately 16 locations in both the perched and upper water-bearing zones,
- Submitting ground water samples for analytical testing for diesel fuel and VOCs,
- Interpreting the data, and
- Reporting findings.

2.0 SITE BACKGROUND AND SETTING

2.1 General Features

The ITT facility is located in the San Fernando Valley, along the border between the cities of Glendale and Burbank. The Verdugo Mountains are approximately 1.5 miles north and east of the property; the Los Angeles River is approximately 0.75 miles south of the property. The ITT facility lies at an elevation of approximately 510 feet above mean sea level. The site surface is generally flat; however, the topography in the site vicinity slopes gently to the south toward the Los Angeles River.

The fenced ITT facility occupies approximately 11.7 acres in an area of industrial and commercial development. The ITT facility is bordered on the north by railroad tracks, on the east by Allen Avenue, on the south by Flower Street, and on the west by adjacent property. The IBC property is directly north and northeast of the ITT facility, and is separated from the ITT facility by the railroad tracks. The area south of the ITT facility is occupied by various commercial, light industrial, and residential properties. The nearest residence is approximately 200 feet south of the ITT facility.

Buildings and parking lots formerly occupied the ITT facility; most of these buildings have been demolished. The majority of the ground surface is covered by concrete and/or asphalt.

2.2 Geology and Hydrogeology

The ITT facility is underlain by poorly sorted, unconsolidated alluvial fan sediments originating from the Verdugo Mountains and Recent Alluvium deposited by the ancient Los Angeles River. The alluvium generally consists of coarse accumulations of sand, gravel, and boulders; fine-grained sediment occurs in the interstices of the coarser material.

The ITT facility is in the eastern portion of the San Fernando Hydrologic Subarea, which is generally characterized by coarse-grained sediments. Regional ground water flow in the site vicinity is generally toward the Los Angeles River. Ground water flow directions have

historically been affected, and locally altered, by operation of municipal well fields.

2.3 Previous Investigations

A number of investigations of subsurface conditions at the ITT facility have been conducted in recent years; a listing of reports prepared in association with those investigations is presented in Appendix A. As part of the ground water investigation at the ITT facility, 13 monitoring wells have been installed to date. Although no on-site source of diesel fuel has been recognized to date, diesel free product ranging in thickness from a sheen to more than 5 feet has been detected in several on-site wells.

Significant diesel free product thickness has been detected off-site, immediately north and northeast of the ITT facility, at the IBC site where documented releases of diesel fuel have occurred. Historically, over 13 feet of free product has been detected floating on ground water at the IBC site (AEMC, 1989). Free product has been noted in wells immediately adjacent to the railroad tracks and on ITT's property, and dissolved ground water contamination underlies ITT's facility (RMC, 1992). Past IBC investigation reports indicate that ground water likely flows south and southwest onto ITT's facility (AEMC, 1989; RMC, 1992; RMC, 1993). ITT suspects that diesel fuel detected in ground water underlying the ITT facility may be emanating from the IBC site based on (1) the absence of a known on-site source of diesel at the ITT facility; (2) the proximity of the IBC site to the ITT facility; (3) the lateral extent and thickness of the free product plume detected at IBC; and (4) the general ground water flow direction(s).

3.0 SUBSURFACE INVESTIGATION PROGRAM

The scope of work presented in this work plan has been designed to provide subsurface geologic and ground water quality information at the ITT facility, and to evaluate the migration pathway(s) by which diesel fuel ground water contamination originating from the IBC property has migrated underneath the ITT facility. To accomplish this investigation, 20 CPT tests will be taken, at the approximate locations shown on Figure 2. HydroPunch ground water and/or diesel free product samples will be collected adjacent to selected CPT locations; approximately 16 HydroPunch locations are anticipated. If possible, ground water samples will be collected from the top of the perched zone as well as the top of the upper water-bearing zone, resulting in collection of up to 32 ground water samples. The ground water samples will be analyzed for VOCs and diesel fuel.

The scope of work outlined in this work plan will be conducted under the supervision of a California Registered Geologist.

3.1 Property Access

Prior to the initiation of field work, the absence of underground utilities will be confirmed through use of an underground utility locator. Underground Services Alert (USA) will also be contacted, and will mark the location of all major utilities at the ITT property boundary. In addition, a concrete coring company will be retained to provide access to underlying soils.

3.2 Health and Safety Plan

An activity-specific Health and Safety Plan has been prepared for this investigation. The plan is presented in Appendix B.

3.3 CPT/HydroPunch Investigation

The CPT/Hydropunch investigation will be conducted in the area south of Well PW-2 and north of Wells SW-1 and SW-2, as depicted on Figure 2. Two CPT/HydroPunch lines will be oriented approximately East to West (EW), approximately parallel to the configuration of the diesel product plume on the IBC site, as depicted by IBC (RMC, 1992, Figure 7). One CPT/HydroPunch line will be oriented approximately North to South (NS), perpendicular to the EW lines. CPT locations will be placed at approximate 60-foot intervals along these lines (a total of 20 locations). The CPT data will be reviewed prior to conducting the HydroPunch survey. At this time, ITT plans to collect HydroPunch ground water samples adjacent to CPT locations along the EW lines (a total of 16 locations). If possible ground water samples will be collected from the top of the perched zone (if present) as well as the top of the upper water-bearing zone, resulting in collection of up to 32 ground water samples. If free diesel product is detected, an attempt will be made to collect a sample of the free product using HydroPunch equipment.

3.3.1 CPT Methodology

Each CPT test will extend from ground surface to the base of the upper water-bearing zone (approximately 80 to 100 feet), if possible. The CPT equipment is housed in a 4-wheel drive van. The CPT procedure consists of advancing a cone-tipped cylindrical probe (piezocone) attached to a string of 1.5-inch-diameter steel pipe into the ground at a constant penetration rate of approximately 2 centimeters per second (cm/sec). The piezocone contains two strain gauged load cells that measure both the tip resistance and the soil shear resistance along the cylinder sleeve. The ratio of the sleeve resistance to the tip resistance provides an index of subsurface conditions and is recorded during the testing procedure in graphical form as a CPT log. Based on established relationships between this measured index of soil behavior properties and specific sediment types, the CPT logs can be interpreted to represent soil types.

Upon completion of each CPT test, the steel pipe assembly and piezocone tip will be removed from the probe hole. In order to minimize the potential for cross contamination, the residual probe hole will be immediately abandoned according to the procedure described in Section 3.3.3.

3.3.2 HydroPunch Sampling Methodology

HydroPunch ground water samples will be collected from the top of the perched zone and the top of the upper-water bearing zone, if possible. The HydroPunch II sampling device will be used during this investigation.

HydroPunch sampling depths will be determined after analysis of the CPT logs. Check valves, stainless steel screen, and O-rings will be inserted into the HydroPunch tool body (1.5 inch-diameter pipe), and a replaceable point will be attached. The tool body will be hydraulically driven into the ground to the desired depth. Then the tool will be pulled back approximately 1.5 feet, exposing the screened sample zone and isolating the collection point. Filling time depends upon the permeability of the formation in the sampled zone; in the perched zone several hours may be needed, and in the upper water-bearing zone a maximum of one hour will be allowed. After filling, a bailer will be lowered into the tool body and a ground water sample will be collected. If free product is present, the bailer will be used to collect a free product sample. After sampling is completed, the tool body will be withdrawn leaving the steel point in the ground. In order to minimize the potential for cross contamination, the residual probe hole will be immediately abandoned according to the procedure described in Section 3.3.3.

Collected ground water will be placed in laboratory-prepared bottles. Sample bottles will be sealed, labeled, placed in plastic bags, and stored on ice in a closed container. All samples will be stored on ice in coolers during field sampling, and in transit to the state-certified laboratory. Samples will be transported to the laboratory within 24 hours of collection. Chain of custody procedures will be followed; custody forms will be relinquished upon sample delivery to the laboratory.

3.3.3 Abandonment Procedures

Immediately after completion of work at each CPT and HydroPunch location, the residual probe hole will be abandoned. The hollow steel pipe without the instrument tip, and a plastic tremie pipe will be advanced to the total depth of the hole. The hole will be grouted, from the base to the top via the tremie pipe, using a bentonite slurry. A concrete patch will be placed at the ground surface.

3.4 Equipment Decontamination

In order to minimize the potential for cross contamination, downhole equipment will be decontaminated after each CPT test and HydroPunch sampling event using an automatic washing system consisting of an enclosed chamber containing scrapers and high pressure spray nozzles fed by a steam cleaner. A clean, new bailer will be used at each HydroPunch location.

3.5 Waste Containment

Waste soil produced during the investigation will be placed in Department of Transportation (DOT)-approved 55-gallon drums. Drums will be sealed and labeled with CPT/HydroPunch location number and the date. Decontamination rinse water will also be stored in 55-gallon drums, sealed and labeled. Drums will be stored on site pending appropriate disposal by ITT Corporation.

4.0 ANALYTICAL TESTING

All analytical testing will be conducted by a state-certified laboratory. The laboratory will be certified in all test methods conducted as part of this investigation. The scope of analytical testing has been selected based upon the types of chemicals that have been detected previously in ground water underlying the ITT facility. Specific compounds recommended for testing are listed below.

- Fuel Hydrocarbons (Diesel) by EPA Method 8015 Modified
- Volatile Organic Compounds by EPA Method 8010

If free product samples are collected, the laboratory will identify the type of hydrocarbon present in the samples.

5.0 DATA ANALYSIS

All data collected during the investigation will be tabulated, reduced and analyzed. CPT logs will be summarized and used to construct geologic cross sections. The information, along with other data, will be used to develop and refine a conceptual model of subsurface geology and contaminant transport, specifically diesel fuel, at the ITT facility. Ground water analytical data will be tabulated, and if appropriate, figures depicting the distribution of VOCs and diesel fuel in ground water will be prepared. Chemical data will be used to assess the location and extent of ground water contamination, and to evaluate if diesel fuel ground water contamination originating on the IBC property has migrated underneath the ITT facility.

6.0 SCHEDULE

The CPT/HydroPunch work plan will be submitted concurrently to the Regional Water Quality Control Board, Los Angeles Region (RWQCB), and the Fire Department. The field investigation will be initiated as soon as possible after receipt of approval. ITT anticipates that one week will be required for contractor notification and mobilization. Field work will require approximately 2.5 weeks. Analytical testing will require approximately three weeks. Data analysis will require approximately two weeks. Therefore, the time needed to complete the investigation is approximately eight to nine weeks, depending upon the amount of time needed to mobilize contractors to the site.

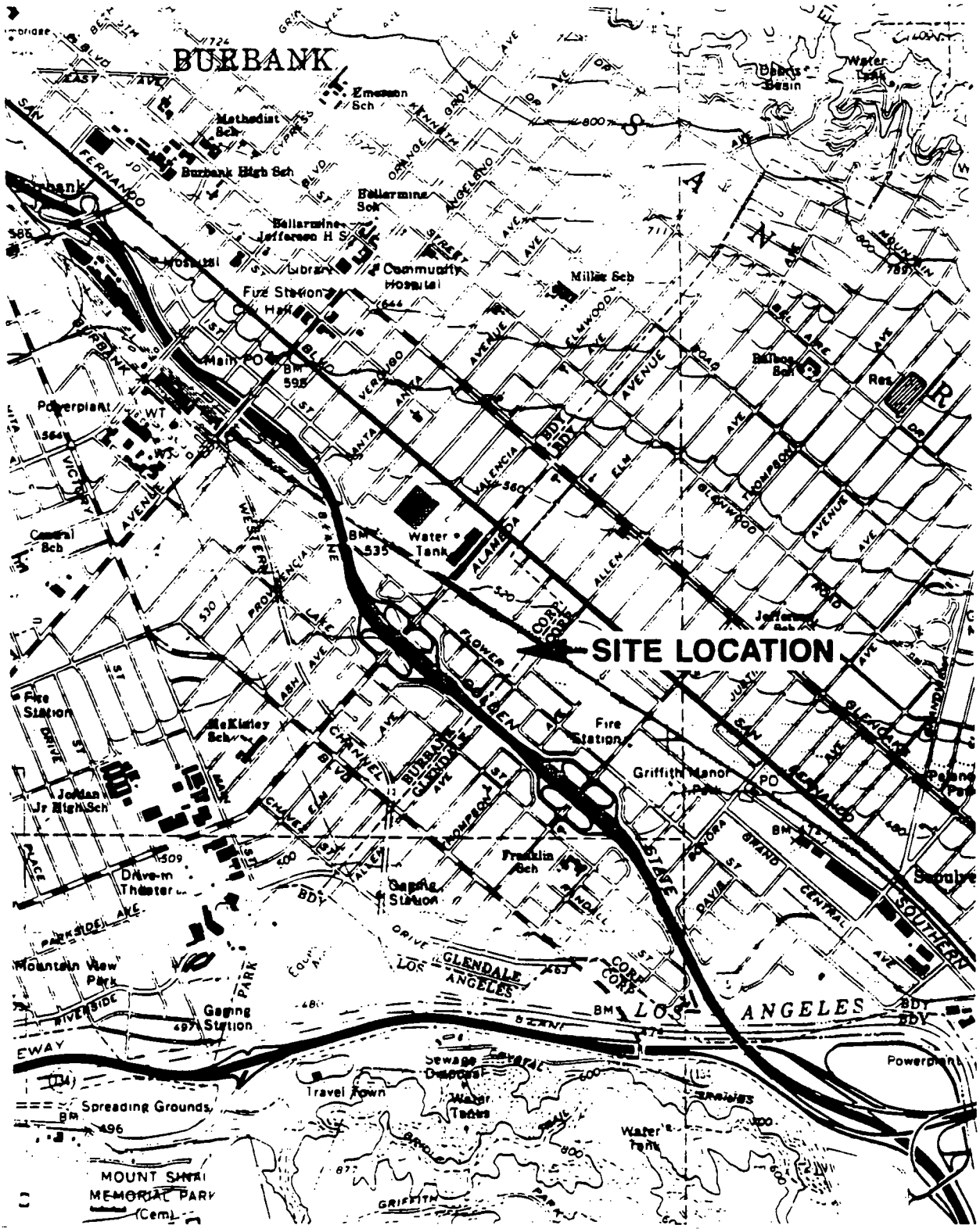
7.0 REFERENCES

American Environmental Management Corporation (AEMC), 1989. *Site Assessment, Phases IV and V for InterState Brands*, dated October 20, 1989.

Remedial Management Corporation (RMC), 1992. *Site Assessment Report InterState Brands Corporation, Plant No. 27, Glendale California*, dated August 26, 1992.

Remedial Management Corporation (RMC), 1993. *Second Quarter 1993 Groundwater Monitoring and Sampling Report Interstate Brands Corporation Plant No. 27, Glendale California*, dated June 18, 1993.

FIGURES



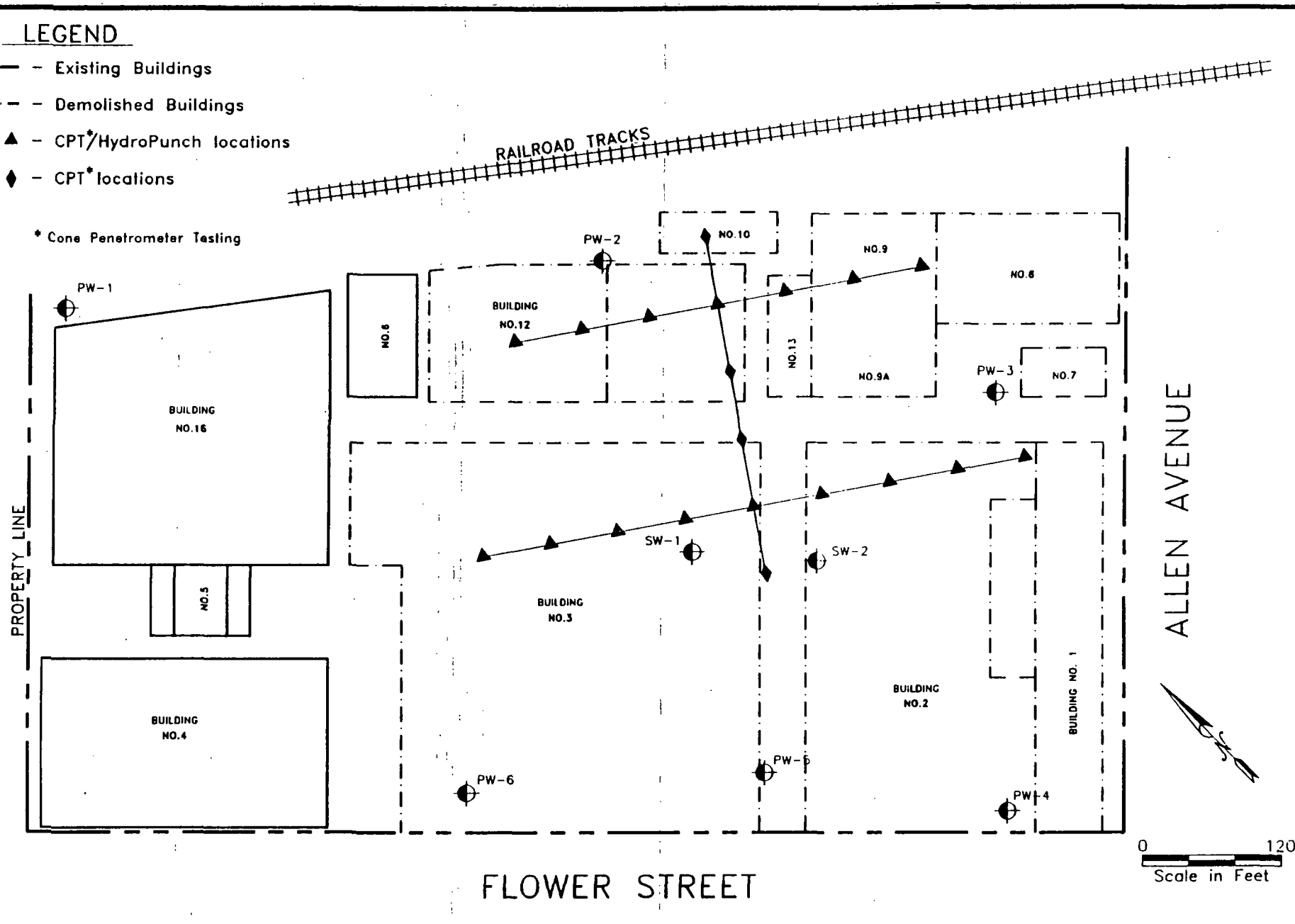
ENVIRON

Vicinity Map

ITT Fluid Products Corporation
Burbank, California

Figure
1

Drafter: J. CAMERANO Date: 12/10/93 Contract Number: 04-3722A Approved: Revised:



ENVIRON
Counsel in Health and Environmental Science

Proposed CPT/HydroPunch Locations

ITT Fluid Products Corporation
Burbank, California

Figure 2

Drafter: J. CAMERANO Date: 12/10/93 Contract Number: 04-3722A Approved: Revised:

APPENDIX A

REPORTS AND DOCUMENTS RELATED TO ITT BURBANK SITE INVESTIGATIONS ON FILE WITH THE LARWQCB

Document	Subject/Title	Date
A.L Burke (ALB)	Preliminary Site Investigation	August 1987
ALB	Preliminary Site Investigation Buildings 2,3, and 8 Final Report	August 21, 1987
ALB	Closure and Additional Site Investigation Cost Estimates	August 21, 1987
ALB	Draft Final Report on Phase 2 Investigation	November 6, 1987
ALB	Closures for Process Sumps in Buildings 2 & 3	November 10, 1987
ALB	Workplan & Estimates for Closure of Building 8	January 4, 1988
ALB	Closure of Sump in Building 5	February 1988
OccuHealth Consultants	Building 12 Mercury Removal	February 23, 1988
ALB	Finalized Closure Plan for Sump in Building 5	March 10, 1988
ALB	Investigation of Contamination	April 1988
ALB	Overview of Investigation and Closure Actions	April 1988
ITT	Application for Closure	May 30, 1988
ALB	Site Characterization and Closure Workplan Draft	July 1988
OccuHealth Consultants	Asbestos Removal in Buildings 3 & 12	August 4, 1988
ALB	Workplan for ITT Building 8	October 6, 1988
ALB	Investigation of Subsurface Contamination	September 16, 1988
ALB	Scope of Work, ITT Projects	September 16, 1988
ALB	Subsurface Investigation Draft	November 1988
ALB	ITT Building 8 Decontamination & Demolition Progress Report #1	December 13, 1988
ALB	Progress Report - Building 3	December 27, 1988
ALB	ITT Building 8 Decontamination & Demolition Progress Report	January 12, 1989
ALB	Progress Report for Building 3	January 30, 1989
ALB	Progress Update, Building 8, ITT	January 30, 1989
ALB	ITT Building & Decontamination & Demolition Progress Report #3	February 17, 1989

REPORTS AND DOCUMENTS RELATED TO ITT BURBANK SITE INVESTIGATIONS ON FILE WITH THE LARWQCB

Document	Subject/Title	Date
ALB	Progress Report #2, Building 3, Preliminary	March 1989
ALB	ITT Building 7 Decontamination & Demolition Progress Report #4	May 2, 1989
ALB	Remediation, ITT Building 8, Final In-House Draft Report	August 3, 1989
Weston	Site Characterization Report and Action Plan for ITT Facility	November 2, 1989
ESI	Workplan, Transformer Clean-Up	
Weston	Soil Gas Screening (Results) of the ITT Aerospace Controls, Burbank	March 27, 1990
Weston	Summary of Asbestos & Residue Sampling of Buildings 1, 2 & 3	March 28, 1990
Weston	Dust Control at Building 8	
Weston	Preliminary Work Plan for Soil & Ground Water Characterization	June 14, 1990
Weston	Preliminary Work Plan for Soils & Groundwater Contamination - Final revised from June 14, 1990 Draft	November 12, 1990
ICF KE	Results of Preliminary Groundwater & Soils Investigation	August 14, 1991
ICF KE	Work Plan for Building 8, ITT Facility	October 15, 1991
ICF KE	Fourth Quarter Sampling and Analysis Report, October - December 1991	January 1992
ICF KE	First Quarter Sampling and Analysis Report, January - March 1992	April 1992
IT Corporation	Health and Safety Plan for PCB Decontamination and Removal of Asbestos Containing Materials for the ITT Burbank Site	June 22, 1992 and July 6, 1992
ICF KE	Second Quarter Sampling and Analysis Report April - June 1992	July 1992
ICF KE	Building 8 PCB Sampling Program Report	August 1992
ICF KE	Third Quarter Progress Report July - September 1992	October 1992
ICF KE	Fourth Quarter Sampling and Analysis Report October - December 1992	January 1993

REPORTS AND DOCUMENTS RELATED TO ITT BURBANK SITE INVESTIGATIONS ON FILE WITH THE LARWQCB

Document	Subject/Title	Date
ICF KE	First Quarter Sampling and Analysis Report January - March 1993	April 1993
ICF KE	Supplemental Work Plan for Additional Work at the ITT Site	April 1993
ICF KE	Second Quarter Sampling and Analysis Report April - June 1993	July 1993
ENVIRON	Third Quarter Sampling and Analysis Report, ITT Fluid Products Corporation, Burbank/Glendale, California July - September, 1993, Volume 1 of 2	October 1993
ENVIRON	Third Quarter Sampling and Analysis Report, ITT Fluid Products Corporation, Burbank/Glendale, California July - September, 1993, Volume 2 of 2	October 1993
ENVIRON	Work Plan for a Subsurface Investigation of Petroleum Hydrocarbons in Shallow Soils	October 1993
ENVIRON	Annual Well Maintenance Program	November 1993
ENVIRON	Slab Protection Plan, ITT Fluid Products, Corp Aerospace Controls Division, Burbank, CA	December 1993

APPENDIX B

SITE HEALTH AND SAFETY PLAN

ITT FLUID PRODUCTS CORPORATION
1200 FLOWER STREET
BURBANK, CALIFORNIA

ENVIRON Corporation
SITE HEALTH AND SAFETY PLAN

This Site Health and Safety Plan is specifically prepared for:

Project Location **1200 Flower Street and off-site locations at Flower Street and Alameda Ave., and Irving Avenue and Cosmic Way, Burbank and Glendale, California**
Case Number **04-3722A**

ALL PERSONNEL PARTICIPATING IN THE FIELD MUST BE TRAINED IN THE GENERAL AND SPECIFIC HAZARDS UNIQUE TO THE JOB AND, IF APPLICABLE, MEET RECOMMENDED MEDICAL EXAMINATION REQUIREMENTS. ALL SITE PERSONNEL AND VISITORS SHALL FOLLOW THE GUIDELINES, RULES, AND PROCEDURES CONTAINED IN THIS SAFETY PLAN. THE PROJECT MANAGER OR SITE HEALTH AND SAFETY OFFICER MAY IMPOSE ANY OTHER PROCEDURES OR PROHIBITIONS BELIEVED TO BE NECESSARY FOR SAFE OPERATIONS.

THIS PLAN IS PREPARED TO INFORM ALL FIELD PERSONNEL, INCLUDING ENVIRON CONTRACTORS AND ENVIRON SUBCONTRACTORS, OF THE POTENTIAL HAZARDS ON THE SITE. HOWEVER, EACH CONTRACTOR OR SUBCONTRACTOR MUST ASSUME DIRECT RESPONSIBILITY FOR ITS OWN EMPLOYEES' HEALTH AND SAFETY.

TABLE OF CONTENTS

I. INTRODUCTION

A. SITE LOCATION: **1200 Flower Street and off-site locations at Flower Street and Alameda Ave., and Irving Avenue and Cosmic Way, Burbank and Glendale, California.**

B.	PLAN PREPARED:	Name **Kim Little** Kim Little	Date **December 14, 1993** Dec 14, 93
C.	PLAN APPROVED:	Project Manager **Carol Serlin** Carol Serlin HSC **Kim Little**	Date 12/14/93 Date
D.	PLAN REVISED:	Name	Date
E.	REVISION APPROVED:	Project Manager	Date
		HSC	Date

F. THE POSSIBLE HAZARDS ON THIS JOB ARE EXPECTED TO BE:
Mechanical hazards (machinery), trip and fall. Exposure to chemicals is expected to be minimal as the hydropunch technique allows little contact with contaminated soil or groundwater.

G. REQUIRED PERSONAL PROTECTIVE ITEMS AND EQUIPMENT FOR THIS PROJECT:
Hardhat, steel-toed boots, and gloves during sampling; also, OVM or OVA

II. PERSONS RESPONSIBLE AND INVOLVED

A. PROJECT MANAGER **Carol Serlin**

Health and Safety Responsibilities **Overall responsibility for project compliance with health and safety plan.**

B. SITE SUPERVISOR **Mike Barnes**

Health and Safety Responsibilities **Implementation of the site-specific health and safety plan for all field-related activities.**

C. SITE HEALTH AND SAFETY OFFICER **Same as site supervisor.**

Health and Safety Responsibilities

D. OTHERS **Mark Katchen, CIH**

Health and Safety Responsibilities **Responsible for providing health and safety consultation for the project.**

E. SUBCONTRACTORS

Health and Safety Responsibilities **Responsible for the safe operation of equipment while on-site and off-site for the health and safety of drilling contractor workers.**

III. FACILITY BACKGROUND

A. FACILITY BACKGROUND AND DESCRIPTION: **Facility manufactures aerospace components. It is located in a commercial and light industrial area of Burbank. ITT is in the process of moving it's operations, and has therefore demolished a number of buildings, with plans to demolish the remaining structures.**

B. SITE HISTORY (USE OF SITE, ORIGIN OF CONTAMINATION): **Facility is an aerospace manufacturing facility. A number of the on-site buildings have been demolished. The remaining buildings are currently occupied and are used by ITT. Perched and upper-water bearing groundwater at the site is known to contain diesel (from underground storage tank releases), detectable levels of petroleum hydrocarbons, and various volatile organic compounds (see page 5 for listing and PELs).**

C. HAZARDOUS INCIDENCE HISTORY (HISTORY OF INJURIES, EXPOSURE, CHEMICAL SPILLS, COMPLAINTS, ETC.): **Unknown.**

D. PURPOSE OF ACTIVITY/OBJECTIVE OF ENVIRON'S WORK (CHARACTERIZATION, REMEDIAL ACTIONS, EXCAVATION, TRENCHING; INCLUDE LOCATION OF AREAS OF KNOWN OR SUSPECTED CONTAMINATION): **ENVIRON will be on-site to oversee the collection of groundwater samples using the hydropunch technique.**

E. SITE STATUS (ACTIVE, INACTIVE, UNKNOWN): **Active.**

F. SURROUNDINGS (LOCATIONS OF CITY, ROADS, RESIDENCES, BUSINESS, NATURAL FEATURES, GRADIENTS, TANKS, ETC): **Commercial, light industrial.**

G. SITE MAP (ATTACHED MAP AT END OF THIS PLAN SHOWING SALIENT FEATURES, INCLUDING LOCATIONS OF ENVIRON'S WORK AND LOCATIONS OF CONTAMINATED AREAS). **See Figures 1 and 2.**

H. CLIMATE

AVERAGE WIND SPEED AND DIRECTION: 5-10 mph

MEAN HIGH TEMPERATURE: 80

MEAN LOW TEMPERATURE: 70

IV. IDENTIFIED CHEMICAL CONTAMINANTS

A. IDENTIFIED CHEMICAL CONTAMINANTS KNOWN TO BE PRESENT

List chemical contaminants that have been identified, their concentration, and the environmental media in which they are present. Hazardous property information for selected chemicals appears in the appendix. Review this information for all chemicals listed below. If chemicals are not listed in the appendix, you must enter the hazardous property information in the appendix in the spaces provided.

Chemical (Enter Code)	Environmental Media	Permissible Exposure Limit (PEL)
bromoform	GW	0.5 ppm
benzene	GW	1 ppm
1,1-dichloroethene (vinylidene chloride)	GW	1 ppm
vinyl chloride	GW	1 ppm
1,2-DCA	GW	1 ppm
carbon tetrachloride	GW	2 ppm
chloroform	GW	2 ppm
1,1,2-TCA	GW	10 ppm
naphthalene	GW	10 ppm
1,3,5-trimethylbenzene	GW	25 ppm
trichloroethene	GW	25 ppm
tetrachloroethene (PCE)	GW	25 ppm
toluene	GW	100 ppm
1,1-dichloroethane	GW	100 ppm
1,1,1-trichloroethane (1,1,1-TCA) (methyl chloroform)	GW	350 ppm
trichloroflouromethane	GW	1000 ppm
cis/trans 1,2-DCE	GW	n/a
bromodichloromethane	GW	n/a

B. SUSPECTED CHEMICAL CONTAMINANTS ON-SITE

List chemical contaminants that are suspected to be present.

Chemical	Environmental Media (Enter Code)
See previous table	

Codes for environmental media:

SI	Sludge
GW	Ground water
SW	Surface water
LW	Liquid waste
So	Soil
A	Air
Other -	Specify

C. CHEMICAL CONTAMINANTS CHARACTERIZATION

Has the site been adequately characterized to the best of your knowledge?

Yes No XX

If yes, list applicable references or previous reports/studies.

V. GENERAL WORK PRACTICES

- No one will be permitted to engage in work operations alone.

- Smoking, eating, drinking, and chewing gum or tobacco will not be permitted within the work zones.

- Personnel should keep track of weather conditions and wind direction to the extent they could affect potential exposure.

- Personnel should be alert to any abnormal behavior on the part of other workers that might indicate distress, disorientation, or other ill effects.

- Personnel should never ignore symptoms that could indicate potential exposure to chemical contaminants. These should be immediately reported to their supervisor or the Site Health and Safety Officer.

- Others (specific to tasks: trenching safety, drill rig safety, site entry, etc.)

VI. SITE CONTROL/WORK ZONES

A. DESCRIBE LOCATIONS OF EXCLUSION ZONE, HOT LINE, CONTAMINATION REDUCTION ZONE, AND DECONTAMINATION AREA AND SUPPORT ZONE. SHOW LOCATIONS ON SITE PLAN. **The exclusion zone will be that area immediately surrounding the hole created by the hydropunch. It will be the responsibility of the site health and safety officer to prevent unauthorized personnel from entering the exclusion zone. When necessary, such as in high traffic areas (off-site installation), the exclusion zone will be delineated with barricade tape, cones, and/or barricades. It is not anticipated that a contamination reduction zone, decontamination area, or support zone will be required.**

B. DEFINE THE SITE CONTROL/SECURITY MEASURES (FENCING, LOCKED GATES, KEYS, SECURITY GUARDS, FLAGGING, ETC.). **Site is fenced. Barrier tape or cones will be used to keep unauthorized personnel form entering the area.**

C. DESCRIBE SAFETY PLAN LOCATIONS. **A copy of the health and safety plan will be kept in the ENVIRON field vehicle at all times.**

VII. SITE RESOURCES

SITE RESOURCES LOCATIONS

Toilet facilities: on-site

Drinking water supply: on-site

Telephone: in ENVIRON truck or field vehicle

Radio: **None available.**

Other:

VIII. HAZARD MITIGATION

Identify procedures to mitigate all hazards listed in Section XIV by placing the task number next to the appropriate mitigating measure. Listing of standard procedures is not inclusive. A specific procedure must be entered to mitigate each hazard identified in Section XIV.

Activity List Number	
	A. Mechanical Hazards
NE	Do not stand near backhoe buckets and earthmoving equipment.
1	Verify that all equipment is in good condition.
NE	Do not stand or walk under elevated loads or ladders.
NE	Do not stand near unguarded excavations and trenches.
NE	Do not enter excavations or trenches over 5 feet deep that are not properly guarded, shored, or sloped.
1	Consult HSC if other mechanical hazards exist.
	B. Electrical Hazards
1	Locate and mark buried utilities before drilling.
1	Utilities located by:
1	Maintain at least 10-foot clearance from overhead power lines.
1	Contact utility company for minimum clearance from high power lines.
1	If unavoidably close to buried or overhead power lines, have power turned off, with circuit breaker locked and tagged.
1	Properly ground all electrical equipment.
1	Avoid standing in water when operating electrical equipment.
1	If equipment must be connected by splicing wires, make sure all connections are properly taped.
1	Be familiar with specific operating instructions for each piece of equipment.
	C. Chemical Hazards
1	Use personal protective equipment indicated in Section X.
1	Conduct direct reading air monitoring to evaluate respiratory and explosion hazards (list instrument, action level, monitoring location, and action to be taken in Section IX).
1	Consult HSC for personal air monitoring.

VIII. HAZARD MITIGATION (Continued)

Activity List Number

D. Temperature Hazards

1

1. Heat Stress

When temperature exceeds 70°F, take frequent breaks in shaded area. Unzip or remove coveralls during breaks. Have cool water or electrolyte replenishment solution available. Drink small amounts frequently to avoid dehydration. Count the pulse rate for 30 seconds as early as possible in the rest period. If the pulse rate exceeds 110 beats per minute at the beginning of the rest period, shorten the work cycle by one-third.

NE

E. Confined Spaces

Confined spaces include trenches, pits, sumps, elevator shafts, tunnels, or any other area where circulation of fresh air is restricted or ability to readily escape from the area is restricted. Consult HSC prior to entering confined space.

- Obtain permit for confined space entry.
- Monitor O_2 and organic vapors before entering. If following values are exceeded, do not enter:
  - O_2 less than 19.5% or greater than 25%.
  - Total hydrocarbons greater than 5 ppm above background, if all air contaminants have not been identified.
  - Concentrations of specific contaminants exceeding action level in Section IX if all contaminants are identified.
- Monitor O_2 and organic vapors continuously while inside confined space. If values cited in Section IX are exceeded, evacuate immediately. Record instrument readings.
- At least one person must be on standby outside the confined space who is capable of pulling workers out of confined space in an emergency.
- Use portable fans or blowers to introduce fresh air to confined spaces whenever use of respirator is required.
- Work involving the use of flame, arc, spark, or other source of ignition is prohibited within a confined space.

VIII. HAZARD MITIGATION (Continued)

Activity
List Number

NE F. Radiation Hazards

If radiation meter indicates 2 mR/hr or more, leave the area and consult HSC.

NE G. Biohazard

Poison oak, poison ivy.
Infectious waste.
Rabid animals.
Ticks, mosquitoes, and other insects (disease carriers or poisonous).
Avoid breathing dust in dry desert or central valley areas (valley fever).
Biological or animal laboratories.
Poisonous reptiles.

NE = NOT EXPECTED

IX. AIR MONITORING

Air monitoring should be conducted with instruments selected to measure contaminants to which employees may be exposed. Measurements should be taken within the breathing zones of workers. If action levels are reached for a 1-minute reading, appropriate action must be taken.

A. GASES AND VAPORS

Instrument & Date of Calibration	Calibration Gas Standard	Frequency/ Duration of Air Monitoring	Action Level[(a)(b)] Above Background (Breathing Zone)	Action
Organic Vapor Meter	**internal**	**every 5-10 minutes**	**1 ppm greater than background sustained for 5 minutes**	**If elevated levels above background are detected, leave area and consult HSC.**

(a) Action Levels for "Known contaminants" should be based upon each contaminant's Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV).

(b) Action levels for unknown contaminants are based upon the following:

HNu or OVA Measurements in Breathing Zone
Reading for 1 minute

Background	Level D
>0-5 ppm above background	Level C
5-500 ppm above background	Level B
500-1000 ppm above background	Level A

Comments:

IX. AIR MONITORING (Continued)

B. EXPLOSION HAZARD **Not Expected**

Instrument & Date of Calibration	Action Level Above Background (Ambient Air)	Frequency/Duration of Air Monitoring	Action

C. OXYGEN DEFICIENCY **Not Expected**

Instrument & Date of Calibration	Action Level (Ambient Air)	Frequency/Duration of Air Monitoring	Action

D. OTHER INSTRUMENTS

Instrument & Date of Calibration	Action Level (Breathing Zone Ambient Air)	Frequency/Duration of Air Monitoring	Action
Date			
Draeger pump/tubes	sustained readings of 1 ppm		use the following tubes: benzene, vinyl chloride, bromoform, 1,2-DCA. See notes on page 13 for action.

X. REQUIRED PERSONAL PROTECTIVE AND RELATED SAFETY EQUIPMENT

Place the activity number from Section XIV next to each item of personal protective equipment required for that task. All personal safety must meet ANSI standards or equivalent.

LEVEL A. B. C. D. **XX**

Comments:

Head

1 **Hardhat**

Eye/Face

1 **Safety Glasses** Faceshield
Chemical Goggles

Hand

1 Neoprene **Nitrile** PVC
Viton Underglove other = 4-H

Body

Full Encapsulating Suit:
Two Piece Rainsuit, Material =
One Piece Splash Suit, Material =
Hooded Tyvek Suit
Hooded Tyvek/Saranex Suit
Hooded Tyvek/Polyethylene Suit
Cloth Coveralls
High Visibility Vest
Other

Lung

SCBA (open circuit, pressure demand):
1/2-Mask Respirator, cartridge =
Full Face Respirator, cartridge =
Other

Ear

1 **Earplug, type = foam, if elevated noise levels**
Earmuff, type =

Foot

1 **Steel-toed Boots, type = leather**
Disposable Overboots, type =

Other Safety Equipment

	Ventilation blower/fan	
As needed	Traffic cones	Lifeline harness
As needed	Barrier tape	Radiation Dosimeter
	Blast alarm	
	Ground fault circuit interrupter	

Comments:

XI. DECONTAMINATION PROCEDURES

A. EQUIPMENT (SAMPLING, CONSTRUCTION, ETC.) DECONTAMINATION (SOLVENTS USED, EQUIPMENT USED, METHOD OF DISPOSAL). ATTACH SITE DECONTAMINATION MAP AS NECESSARY. **All undedicated sampling equipment and sampling meters (if applicable) will be cleaned prior to and between each use. Decontamination fluids will be contained and stored on-site in 55-gallon drums pending appropriate disposal.**

B. PERSONNEL DECONTAMINATION (SOLVENTS USED, METHOD OF SOLVENT DISPOSAL; INCLUDE DECONTAMINATION METHOD OF PPE AND DISPOSAL OF PPE). ATTACH DECONTAMINATION MAP AS NECESSARY.
Decontamination of employees is not expected; however, all disposible PPE will be contained in 55-gallon drums on-site pending appropriate disposal.

C. INVESTIGATION-DERIVED MATERIAL DISPOSAL

1. Drill cuttings/well water: on-site 55 gallon drums
2. Decontamination solutions: on-site 55 gallon drums
3. Other

XII. DOCUMENTATION

ENVIRON PERSONNEL TRAINING AND MEDICAL RECORDS ARE AT ENVIRON CORPORATION, ONE PARK PLAZA, SUITE 700, IRVINE, CALIFORNIA. RECORDS WILL BE MAINTAINED ON-SITE AS NECESSARY.

A. PROJECT PERSONNEL LIST AND SAFETY PLAN DISTRIBUTION RECORD

1. ENVIRON Employees

All project staff must sign indicating they have read and understand the Site Health and Safety Plan. A copy of this Site Health and Safety Plan must be made available for their review and readily available at the job site.

Employee Name/Job Title	Date Distributed	Signature

2. Contractors, Subcontractors

A copy of this safety plan shall be provided to contractors and subcontractors who may be affected by activities covered under the scope of this Site Health and Safety Plan for their information only, although the contractors and subcontractors remain responsible for the safety of their own employees. All contractors and subcontractors must comply with applicable OSHA, EPA, and local government rules and regulations.

Firm Name	Contract Person	Date Distributed

XII. DOCUMENTATION (Continued)

B. HEALTH AND SAFETY MEETING - ALL PERSONNEL PARTICIPATING IN THE PROJECT MUST RECEIVE INITIAL HEALTH AND SAFETY ORIENTATION. THEREAFTER, A BRIEF TAILGATE SAFETY MEETING IS REQUIRED AS DEEMED NECESSARY BY THE SITE HEALTH AND SAFETY OFFICER (OR AT LEAST ONCE EVERY 10 WORKING DAYS).

Date	Topics	Name of Attendee	Employee Firm Name	Initials

XII. DOCUMENTATION (Continued)

C. VISITOR - IT IS ENVIRON'S POLICY THAT VISITORS MUST FURNISH THEIR OWN PERSONAL PROTECTIVE EQUIPMENT. ALL VISITORS ARE REQUIRED TO SIGN THE VISITOR LOG AND COMPLY WITH HEALTH AND SAFETY PLAN REQUIREMENTS. IF THE VISITOR REPRESENTS A REGULATORY AGENCY CONCERNED WITH SITE HEALTH AND SAFETY ISSUES, THE SITE HEALTH AND SAFETY OFFICER SHALL ALSO IMMEDIATELY NOTIFY HSC.

VISITOR LOG

Name of Visitor	Firm Name	Date of Visit	Signature

XIII. CONTINGENCY/EMERGENCY INFORMATION

A. REQUIRED EMERGENCY EQUIPMENT LOCATION

Safety shower/eyewash: _____
First aid kit: In ENVIRON field vehicle.
Fire extinguisher: In ENVIRON field vehicle.
Other: _____

B. EMERGENCY TELEPHONE NUMBERS

Ambulance:	911	
Police:	911	
Fire department:	911	
Hospital:	818-843-5111	
Client contact:	Theresa Olmstead 818-953-2119	
Poison Control Center:	(800) 233-3360	
in San Francisco	_____	
CHEMTREC:	(800) 424-9300	
Project Manager	Office (714)261-5151	Home _____
HSC	Office (714)261-5151	Home _____

C. STANDARD PROCEDURES FOR REPORTING EMERGENCIES

When calling for assistance in an emergency situation, the following information should be provided:

1. Name of person making call
2. Telephone number at location of person making call
3. Name of person(s) exposed or injured
4. Nature of emergency
5. Actions already taken

Recipient of call should hang up first--not the caller.

D. EMERGENCY ROUTES: ATTACH MAP SHOWING ROUTE TO NEAREST HOSPITAL. DESCRIBE NARRATIVELY THE ROUTE TO THE HOSPITAL. HAS HOSPITAL BEEN CONTACTED TO DETERMINE IF THEY WILL HANDLE A CHEMICAL EXPOSURE?

Proceed northwest on Flower Street to Alameda Ave. Turn left and proceed southwest to Buena Vista Street (about 2-miles). Turn left on Buena Vista and proceed south to St. Joseph's Medical Center (on the right hand side).

E.CONTINGENCY PLANS AS APPROPRIATE: DESCRIBE CONTINGENCY PLANS FOR EMERGENCIES SUCH AS FIRES, EMERGENCY CARE, INJURY, PIPE OR OTHER EQUIPMENT FAILURE. INCLUDE EMERGENCY SIGNALS AND EVACUATION ROUTES. IF FORMAL CONTINGENCY PLAN DOCUMENT HAS BEEN PREPARED, ATTACH A COPY.

In case of emergency, all personnel will meet by the east gate for a head count. All minor injuries will be treated in the field, all personnel requiring medical attention will be taken to St. Joseph's Medical Center.

POST AT JOB SITE (AS APPROPRIATE)

XIV. HAZARD ANALYSES

List all activities in the Job Activity Column and assign a number to each activity (example: 1. Ground Water Sampling)

Identify which categories of hazard exist at each activity.

EXAMPLE

Activity Number	Job Task	Mech.	Elec.	Chem.	Temp.	Acoust.	Fire or Explos.	O_2 Deficiency-Confined Space	Bio-hazard
1	hydropunch groundwater sampling	X	X		X				

APPENDIX

to Attachment 5B

HAZARDOUS PROPERTY INFORMATION

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[a]	LEL UEL	LD_{50} mg/kg	TLV-TWA[a]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms
	Acrolein	22%	0.8410	1.9	-15	214 mm	2.8% 31%	46	0.1 ppm	5 ppm	0.16	BCED	BJ	ABDFGHIKL MNOPQR
	Acrylonitrile	7.1%	0.8060	1.8	30	83 mm	3% 17%	82	2 ppm	4,000 ppm	17	BCEGO	DIG	FGIKLMNOR
xx	Benzene	820 ppm	0.8765	2.8	12	75 mm	0.339% 7/1%	3800	1 ppm	2,000 ppm	12	BCGO	CIG	BCDFHIKLM NOQR
	Bromomethane	0.1 g	1.732	3.3	None	1.88 atm	13.5%[c] 14.5%		5 ppm[b]	2,000 ppm	No odor	CD		BCDEIJKLM NOQR
	Bromodichloromethane	Insoluble	1.980	--	None		Non-flam	916	None established	None specified		CGO		BIMN
	Bromoform	0.01 g	2.887	--	None	5 mm	Non-flam	1,147	0.5 ppm	n/a	1.3	CED		BCDKLM
	Carbon Tetrachloride	0.08%	1.5967	5.3	None	91 mm	Non-flam	2,800	5 ppm[b]	300 ppm	96	CD	JGH	ABCFGHKM O
	Chlorobenzene	0.01 g	1.1058	3.9	84	8.8 mm	1.3% 9.6%	2,910	10 ppm	2,400 ppm	0.68	BCD	CIF	BCFIKLMNO PQR
	Chloroethane	0.6 g	0.8978	2.2	-58	1.36 atm	3.8% 15.4%		1,000 ppm	20,000 ppm		BCD		BFHIKMNP
	2-Chloroethylvinyl Ether	Insoluble	1.0475	3.7	80	30 mm	--	250	None established	None specified		BCD		NIM
	Chloroform	0.8 g	1.4832	4.12	None	160 mm	Non-flam	800	10 ppm[b]	1,000 ppm	85	CD		BCDGIKLM N
	Chloromethane	0.74%	0.9159	1.8	32	50 atm	7.6% 19%		50 ppm[b]	10,000 ppm		BCD	DHF	ABCDEFGIJ KLOQR
	Dibromochloromethane	Insoluble	2.451	--	--	--	--	848	None established	None specified		BCD		BFHIMNPQ
	1,1-Dichloroethane (DCA)	0.1 g	1.1757	8.4	22	182 mm	6% 16%	725	100 ppm	4,000 ppm	5	BCD		AGHIMNO
	1,2-Dichloroethane	0.8%	1.2554	3.4	55	87 mm	6.2% 16%	670	10 ppm[b]	1,000 ppm	6	BCDG		BCFGOLMN Q

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[c]	LEL UEL	LD_{50} mg/kg	TLV-TWA[e]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms
xx	1,1-Dichloroethylene (DCE)	2,250 mg/l @ 77°F	--	3.4	3	591 mm	7.3% 16.0%	200	5 ppm[h]	None specified		BCD		BIMN
	Trans-1,2-Dichloroethylene	Slightly soluble	1.2565	--	36	400 mm	9.7% 12.8%		None established	None specified	17	BCD		ABFILOQ
	1,2-Dichloropropane	0.26%	1.583	3.9	60	40 mm	3.4% 14.5%	1,900	75 ppm	2,000 ppm	50	BCD		ABGHIKMNO
	Cis-1,3-Dichloropropane	Insoluble	1.2	3.8	83	28 mm	5% 14.5%		1 ppm[h]	None specified		BCD		ABGIKLMNP
	Trans-1,3-Dichloropropane	Insoluble	1.2	3.8	83	28 mm	5% 14.5%		1 ppm[h]	None specified		BCD		ABGIKLMNP
	Ethylbenzene	0.015 g	0.867	3.7	59	7.1 mm	1.0% 6.7%	3,500	100 ppm	2,000 ppm	2.3	BCD	CIF	ABFHIKLMNPQR
	Methylene Chloride	Slightly soluble	1.335	2.9	None	350 mm	12%[e] unavailable	167	50 ppm[h]	5,000 ppm	250	CED	CIF	BCIKLMNPR
	1,1,2,2-Tetrachloroethane	0.19%	1.5953	5.8	None	5 mm	Non-flam		1 ppm[h]	150 ppm	3-5	CD		ABCFHIKLMNOQ
xx	Tetrachloroethylene	0.15 g/ml	1.6227	5.8	None	15.8 mm	Non-flam	8,850	50 ppm[h]	500 ppm		CD		ACFHIKLMNP
	1,1,1-Trichloroethane (TCA)	0.7 g	1.3390	4.6	None	100 mm	8.0%[e] 10.5%	10,300	350 ppm	1,000 ppm	20-400 (500-1,000)	BCED		ABEFHIKLNOP
	1,1,2-Trichloroethane	0.45	1.4397	4.6	None	19 mm	6%[e] 15.5%	1,140	10 ppm	500 ppm	0	C		DEFGHIKMNOPQ
xx	Trichloroethylene (TCE)	0.1%	1.4642	4.5	90[d]	58 mm	12.5% 90%	4,920	50 ppm[h]	1,000 ppm	28	BC		BFKLNOPQ
	Trichlorofluoromethane	0.11 g	1.494	--	None	0.91 atm	Non-flam		1,000 ppm	10,000 ppm	5	CD		BFHKLQ
	Toluene	0.05 g	0.866	3.2	40	22 mm	1.3% 7.1%	5000	100 ppm	2,000 ppm	2.4	BC	BHE	DEFHIKLMNOPQ

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[c]	LEL UEL	LD_{50} mg/kg	TLV-TWA[e]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms
	Vinyl Chloride	negligible	.09100	2.24	-108	3.31 atm	3.6% 33%	500	1 ppm	None Specified	3000	BCEG	DJG	ABFHIKLMN
METALS														
	Arsenic	[b]	5.727	n/a	None	n/a	[f]		0.2 mg/m³	None specified		CEG	CJG	ACDGJMOQR
	Beryllium	[b]	1.85	n/a	None	n/a	[f]		2 µg/m³	None specified		C		IJMNR
	Cadmium	[b]	8.642	n/a	None	n/a	[f]	225	0.05 mg/m³	40 mg/m³		C		ABGHIKLMNQR
	Chromium	[b]	7.20	n/a	None	n/a	[f]		0.5 mg/m³[h]	500 mg/m³		C		FMNQ
	Copper	[b]	8.92	n/a	None	n/a	[f]		0.1 mg/m³	None specified		C		FGIJMOR
	Lead	[b]	11.3437	n/a	None	n/a	[f]		50 µg/m³	None specified		C		ACDFGKOQR
	Mercury	[b]	13.5939	7.0	None	0.0012 mm	[f]		50 µg/m³[h]	28 mg/m³		C		AGLMNQ
	Nickel	[b]	8.9	n/a	None	n/a	[f]		1 mg/m³	None specified		C		DGHLMNQ
	Silver	[b]	10.5	n/a	None	n/a	[f]		0.01 mg/m³	None specified		C		IN
	Thallium	[b]	11.85	n/a	None	n/a	[f]		0.01 mg/m³	20 mg/m³		C	BG	ABGLNOQ
	Zinc	[b]	7.14	n/a	None	n/a	[f]		None established	None specified		C		DF
MISCELLANEOUS														
	Asbestos	Insoluble	2.5	n/a	None	n/a	Non-flam		0.2 fibers/cc	None specified		CG		MN
	Cyanides	58-72%		n/a	None	n/a	Non-flam		5 mg/m³			CE		FKLMPQ

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[c]	LEL UEL	LD_{50} mg/kg	TLV-TWA[e]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[g] Property	Dermal[h] Toxicity	Acute[i] Exposure Symptoms
	PCB (generic)	Slightly	--	n/a	None	n/a	Non-flam		1.0 $\mu g/m^3$[i]	None specified		CG		CHLPQ
	Phenol	8.4%	1.0576	3.2	175	0.36 mm	1.8% 8.6%	414	5 ppm	100 ppm	0.04	C		ABCDGIKM NOQR
	Xylene	0.00003%	0.8642	3.7	84	9 mm	1.1% 7%	5,000	100 ppm	10,000 ppm	0.5-200 (200)	BCD		ABFHIKLMN PQ
	Acetone	Soluble	0.8	2.0	-4	400 mm	2.6% 12.8%	9,750	750 ppm	10,000 ppm	13	BCD	DI	H
	Chromic Acid	Soluble	1.67-2.82	n/a	None	n/a	Non-flam		0.05 mg/m^3	None specified		ACEG		GHI
xx	Diesel Fuel	Insoluble	0.81-0.90	--	130	--	0.6-1.3 6-7.5		None established	None specified	0.08	BC	ABC	IN
	Gasoline	Insoluble	0.72-0.76	3.4	-45	Variable	1.4% 7.6%		300 ppm	None specified	0.005-10 x0.25	CD	AB	IN
	Kerosene	Insoluble	0.83-1.0	--	100-165	5	0.7% 5.0%		None established	None specified	1.0	BCD	AB	IN

SITE-SPECIFIC SUBSTANCES
(Add hazardous property information on any substances that are of concern at the site but are not listed above.)

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[e]	LEL UEL	LD_{50} mg/kg	TLV-TWA[g]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[c]	LEL UEL	LD_{50} mg/kg	TLV-TWA[g]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms

EXPLANATIONS AND FOOTNOTES

Water solubility is expressed in different terms in different references. Many references use the term "insoluble" for materials that will not readily mix with water, such as gasoline. However, most of these materials are water soluble at the part per million or part per billion level. Gasoline, for example, is insoluble in the gross sense, and will be found as a discrete layer on top of the ground water. But certain gasoline constituents, such as benzene, toluene, and xylene, will also be found in solution in the ground water at the part per million or part per billion level.

a. Water solubility expressed as 0.2 g means 0.2 grams per 100 grams water at 20°C.

b. Solubility of metals depends on the compound in which they are present.

c. Several chlorinated hydrocarbons exhibit no flash point in a conventional sense, but will burn in the presence of high energy ignition source or will form explosive mixtures at temperatures above 200°F.

d. Practically non-flammable under standard conditions.

e. Expressed as mm Hg under standard conditions.

f. Explosive concentrations of airborne dust can occur in confined areas.

g. Values for Threshold Limit Value-Time Weighted Average (TLV-TWA) are OSHA Permissible Exposure Limits (PELs) except where noted in h and i.

h. TLV-TWA adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), which is lower than the OSHA PEL.

i. TLV-TWA recommended by the National Institute for Occupational Safety and Health (NIOSH). A TLV or PEL has not been adopted by ACGIH or OSHA.

j.
- A - corrosive
- B - flammable
- C - toxic
- D - volatile
- E - reactive
- F - radioactive
- G - carcinogen
- H - infections

APPENDIX
Hazardous Property Information

Check if Present	Material	Water Solubility[e]	Specific Gravity	Vapor Density	Flash Point °F	Vapor Pressure[e]	LEL UEL	LD_{50} mg/kg	TLV-TWA[g]	IDLH Level	Odor Threshold or Warning Concentration (ppm)	Hazard[j] Property	Dermal[k] Toxicity	Acute[l] Exposure Symptoms

[k] Dermal Toxicity data is summarized in the following three categories;

Skin Penetration

- \- A - negligible penetration (solid-polar)
- \+ B - slight penetration (solid-nonpolar)
- ++ C - moderate penetration (liquid/solid-nonpolar)
- +++ D - high penetration (gas/liquid-nonpolar)

Systemic Potency

- E - slight hazard - LD_{50} = 500-15,000 mg/kg
  lethal dose for 70 kg man = 1 pint-1 quart
- F - moderate hazard - LD_{50} = 50-500 mg/kg
  lethal dose for 70 kg man = 1 ounce-1 pint
- G - extreme hazard - LD_{50} = 10-50 mg/kg
  lethal dose for 70 kg man = drops to 20 ml

Local Potency

- H - slight - reddening of skin
- I - moderate - irritation/inflammation of skin
- J - extreme - tissue destruction/necrosis

[l] Acute Exposure Symptoms

- A - abdominal pain
- B - central nervous system depression
- C - comatose
- D - convulsions
- E - confusion
- F - dizziness
- G - diarrhea
- H - drowsiness
- I - eye irritation
- J - fever
- K - headache
- L - nausea
- M - respiratory system irritation
- N - skin irritation
- O - tremors
- P - unconsciousness
- Q - vomiting
- R - weakness